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Department of Forensic Science

VIRGINIA

DEPARTMENT

DIGITAL & MULTIMEDIA

EVIDENCE SECTION

TRAINING MANUAL

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Appendix A: Training and Assessment/Training of Experienced Personnel
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1 IMAGING MODULE

1.1. Objectives

- 1.1.1. Understand and explain basic conventional and digital imaging and how the images are produced.
- 1.1.2. Understand and explain the various techniques utilized with the capture and storage of digital media.
- 1.1.3. Understand, demonstrate and be able to explain clarification techniques that apply to Forensic Digital Image Analysis. (i.e. sharpening, brightness, contrast, etc.).
- 1.1.4. Gain the capability to operate hardware and software utilized in Forensic Digital Image Analysis.
- 1.1.5. Understand and perform routine maintenance on hardware.
- 1.1.6. Gain the ability to visualize and comprehend details that can be utilized for image comparisons between known images of people, property and clothing to those of an unknown people, property and clothing.

1.2. Methods of Instruction

1.2.1. Lectures

- 1.2.1.1. How images, both conventional and digital, are produced.
- 1.2.1.2. Different types of formats and their uses.
- 1.2.1.3. Evidence handling and note taking.
- 1.2.1.4. Proficient use of related software programs.
- 1.2.1.5. Comparison interpretation.
- 1.2.1.6. Different methods, utilizing a variety of formats, to output the results of an analysis.

1.2.2. Literature Review

Inglis, Andrew F and Luther, Arch C. Video Engineering, 3rd. edition, McGraw-Hill, New Your, 1999

Davies, Adrian and Fennessy, Phil. Digital Imaging, 4th. Edition, Focal Press, Oxford, 2001

Blitzer, Herbert L and Jacobia, Jack. Forensic Digital Imaging and Photography, Academy Press, San Diego, 2002.

Equipment and Software Users Manuals

Department of Forensic Science, Digital Evidence Procedures Manual – video sections

Department Of Forensic Science, Quality Manual

Best Practices for the Retrieval of Video Evidence

New Publications as they become available

1.2.3. Training Programs

- 1.2.3.1. Photoshop Basics—Proficient operation of the software as it pertains to video analysis; to include use of de-interlace, filter routines, levels, layering, stamp tool, etc.
- 1.2.3.2. SignalScape/ Star Witness Video and Audio system - Proficient operation of software as it pertains to forensic video analysis. Two day class offered by the vendor in the operation of their software programs.
- 1.2.3.3. Avid Video Analysis System - Proficient operation of software as it pertains to forensic video analysis. Three day class offered by the vendor in the operation of their software programs.
- 1.2.3.4. Basic Forensic Video and the Law course offered by the Forensic Enforcement/Emergency Services Video Association, (LEVA). Advanced course preferred.
- 1.2.3.5. Video/ Image Comparison Course offered by LEVA.
- 1.2.3.6. DPS Video and Audio – Proficient operation of the software as it pertains to video analysis; to include the use of editing tools.

1.2.4. Demonstration

- 1.2.4.1. Basic clarification techniques will be observed from beginning to end and notes will be taken by the trainee. These requirements will demonstrate that the Trainee complied with the required procedures.

1.2.5. Laboratory Exercises

- 1.2.5.1. Imaging: Demonstrate the understanding of focal length and exposure and its effects on visual results.
- 1.2.5.2. Viewing of various types of damaged video recordings to understand the cause and repair needed to restore the media to a condition that permits the recovery of the recorded information.
- 1.2.5.3. Casework will be completed by the trainee under the direct supervision of the section supervisor; content and technique used will be dependent on the cases submitted. These cases will be made of up both mock and actual cases utilizing a variety of problem solving techniques.

1.3. Evaluation

1.3.1. Oral/ Written Examination

- 1.3.1.1. Oral review on each technique and procedure utilized in this section.
- 1.3.1.2. Written paper(s) on the history of digital imaging technology or a related topic to be assigned and approved by the section supervisor.
- 1.3.1.3. Various techniques and terms to be defined both orally and written.

1.3.2. Laboratory Testing

- 1.3.2.1. Trainee must complete a minimum of 1 year of casework under the direct supervision of the section supervisor. This will include mock and actual cases demonstrating a variety of problem solving solutions.

1.3.3. Oral Exercises

1.3.3.1. Technical review sessions. The trainee **MUST** successfully complete this portion of the requirements.

1.3.4. Courtroom Exercises

1.3.4.1. Trainee will be required to work a case that is representative of actual casework. Trainee must show the ability to defend the conclusions of the examinations and answer technical questions in a courtroom scenario. The trainee **MUST** successfully complete this portion of the requirements.

1.4. Examination Questions

1.4.1. Explain how video recordings are produced.

1.4.2. Who are the principle players in the development of the video cassette recorder? Approximately what year was this?

1.4.3. Explain the following terms/techniques:

- Raster
- CRT
- CCD
- Pixel
- Resolution
- Focal Length
- Compression
- Encoding
- Interpolation
- Frame grabber
- Other terms may be added as necessary

1.4.4. Provide a definition for digital Forensic Image Analysis

1.4.5. Explain the difference between conventional and digital images and their capture.

1.4.6. Explain the most common clarification techniques:

- Brightness
- Contrast
- Sharpening
- Levels
- Frame averaging

1.4.7. Explain the most common limitations in Digital Forensic Image Analysis

- Poor quality
- Focal length
- CCD
- Lighting
- Compression

1.4.8. Explain the most common file formats and the difference between each

1.4.9. Name two types of compression methods and explain the difference between them.

2 VIDEO MODULE

2.1 Objectives

- 2.1.1 Understand and explain through demonstration how video recordings are produced.
- 2.1.2 Understand and explain the various techniques incorporated in security systems (i.e. switchers, multiplexers, time lapse, digital video recorders, etc.).
- 2.1.3 Recognize and demonstrate common problems that may interfere with the recording and /or playback of video recordings (i.e. out-of-sync, switching, interference, multiplexing, compression, tracking, etc).
- 2.1.4 Understand, explain and demonstrate clarification techniques that apply to Forensic Video Analysis (i.e. sharpening, brightness, contrast, levels, interlacing, de-interlacing, demuxing, frame averaging etc).
- 2.1.5 Gain the capability to utilize the various hardware and software programs used in Forensic Video Analysis (i.e. record/playback units, time lapse units, etc).
- 2.1.6 Gain the capability to perform routine maintenance on hardware.
- 2.1.7 Gain the capability to make comparisons between known images of people, property and clothing to those of an unknown suspect nature.

2.2 Methods of Instruction

- 2.2.1 Lectures
 - 2.2.1.1 How video recordings are produced
 - 2.2.1.2 Different types of video formats and their uses.
 - 2.2.1.3 Security system techniques
 - 2.2.1.4 Evidence handling and note taking
 - 2.2.1.5 Use of a variety of Forensic Video analysis software programs
 - 2.2.1.6 Comparison interpretation
 - 2.2.1.7 Different methods utilizing a variety of formats to output the results of analysis.
- 2.2.2 Literature Review
 - Inglis, Andrew F and Luther, Arch C. Video Engineering. 3rd. edition, McGraw-Hill, New Your, 1999
 - Davies, Adrian and Fennessy, Phil. Digital Imaging. 4th. Edition, Focal Press, Oxford, 2001
 - Blitzer, Herbert L and Jacobia, Jack. Forensic Digital Imaging and Photograph. Academy Press, San Diego, 2002.
 - Equipment and Software Users Manuals
 - Department of Forensic Science, Digital Evidence Procedures Manual – video sections
 - Department of Forensic Science, Quality Manual

Best Practices for the Retrieval of Analog and Digital Video Evidence

New Publications as they become available

2.2.3 Training Programs

2.2.3.1 Photoshop Basics—Proficient operation of the software as it pertains to video analysis; to include use of de-interlace, filter routines, levels, layering, stamp tool, etc.

2.2.3.2 SignalScape/Star Witness Video and Audio system - Proficient operation of software as it pertains to forensic video analysis. Two day class offered by the vendor in the operation of their software programs.

2.2.3.3 Avid Video Analysis System - Proficient operation of software as it pertains to forensic video analysis. Three day class offered by the vendor in the operation of their software programs.

2.2.3.4 Basic Forensic Video and the Law course offered by the Forensic Enforcement/Emergency Services Video Association, (LEVA). Advanced course preferred.

2.2.3.5 Video/ Image Comparison Course offered by LEVA.

2.2.3.6 DPS Video and Audio – Proficient operation of the software as it pertains to video analysis; to include use of editing tools.

2.2.4 Demonstration

2.2.4.1 Basic clarification techniques will be observed from beginning to end and notes will be taken by the trainee. These requirements will demonstrate that the Trainee complied with the required procedures.

2.2.5 Laboratory Exercises

2.2.5.1 Photography – demonstrate the understanding of focal length and exposure and its effects on visual results.

2.2.5.2 Viewing of various types of damaged video recordings to understand the cause and repair needed to restore the media to a condition that permits the recovery of the recorded information.

2.2.5.3 Casework will be completed by the trainee under the direct supervision of the section supervisor- content and technique used will be dependent on the cases submitted. These cases will be made of up both mock and actual cases utilizing a variety of problem solving techniques.

2.3 Evaluation

2.3.1 Oral/ Written Examination

2.3.1.1 Oral review on each technique and procedure utilized in this section.

2.3.1.2 Written paper(s) on how video recording are produced or related topic to be assigned and approved by the section supervisor. This will be considered as a technical research paper.

2.3.1.3 Various techniques and terms to be defined both orally and written.

2.3.2 Laboratory Testing

2.3.2.1 Trainee must complete a minimum of 1 year of casework under the direct supervision of the Section Supervisor. This will include mock and actual cases demonstrating a variety of problem solving solutions.

2.3.3 Oral Exercises

2.3.3.1 Technical review sessions. The trainee MUST successfully complete this portion of the requirements.

2.3.4 Courtroom Exercises

2.3.4.1 Trainee will be required to work a case that is representative of actual casework. Trainee must then show the ability to defend the conclusion of the examinations and answer technical questions in a courtroom scenario. The trainee MUST successfully complete this portion of the requirements.

2.4 Examination Questions

2.4.1 Explain how video recordings are produced.

2.4.2 Who are the principle players in the development of the video cassette recorder? Approximately what year was this?

2.4.3 Explain the following terms/techniques:

- Field
- Frame
- Raster
- CRT
- CCD
- Switcher
- Multiplexer
- Time-Lapse (advantages/disadvantages)
- Pixel
- Resolution
- Focal Length
- Compression
- DVR
- Multiplex Recordings (advantages/disadvantages)
- Video head alignment
- Horizontal blanking
- Encoding
- Interpolation
- Syncing
- Frame grabber
- NTSC
- Tracking
- Other terms may be added as necessary

2.4.4 Provide a definition of Forensic Video Analysis

2.4.5 Explain the difference between single frame video capture and video stream capture.

2.4.6 Explain the most common clarification techniques:

- Interlace/Deinterlace
- Brightness
- Contrast
- Sharpening
- Levels
- Frame averaging

2.4.7 Explain the most common limitations in forensic video analysis

- Poor tape quality
- Out-of-sync switching
- Camera placement
- Focal length
- Quad recordings
- Electrical interference
- Multiplexing
- Compression

2.4.8 Explain NTSC

2.4.9 Explain what a waveform monitor is and its uses

2.4.10 Explain what a vector scope and its uses

2.4.11 What is a frame grabber?

2.4.12 Name the most common video formats and explain their differences

2.4.13 Name the three types of video signals and explain their differences

2.4.14 Explain the most common playback problems.

- Tracking
- Interference
- Head alignment
- Formats

2.4.15 Name two types of compression methods and explain the difference between them.

3 DIGITAL MEDIA MODULE**3.1 Objectives**

- 3.1.1 Understand and explain through oral demonstration the variety of digital media and their functions.
- 3.1.2 Understand and explain through oral demonstration the write blocker process.
- 3.1.3 Understand and explain through oral demonstration the process of imaging digital media.
- 3.1.4 Understand and explain through oral demonstration the function of the hash and its purpose.
- 3.1.5 Gain the capability to utilize various hardware and software programs utilized in the processing of digital media.
- 3.1.6 Gain the capability to perform wiping, imaging and hashing of digital media.

3.2 Methods of Instruction

3.2.1 Lectures

- 3.2.1.1 Removal of media.

- 3.2.1.2 Wiping digital media and its function.

- 3.2.1.3 Target drive preparation.

- 3.2.1.4 Hashing digital media and its function.

- 3.2.1.5 Imaging of digital media and its purpose

- 3.2.1.6 Removable media imaging

3.2.2 Literature Review

Kruse, Warren G. and Jay G. Heiser. Computer Forensic Response Essentials. Boston: Addison-Wesley, 2002.

Electronic Crime Scene Investigation: A Guide for First Responders. Washington, D.C.: U.S. Department of Justice, 2001.

Best Practices for Seizing Electronic Evidence A Pocket Guide for First Responders. 3rd ed. Washington, D.C.: U.S.

Digital Intelligence User's Manual.

Logicube Desktop Write Protect Hard Drive Imagers User's Manuals.

iLook User's Manual.

Owner's Manuals, User's Manuals and vender specific manuals should be referred to for equipment instructions.

Department of Forensic Science, Digital Evidence Procedures Manual – Sections 3 – 10.

Department of Forensic Science, Quality Manual.

New relevant material as it becomes available.

3.2.3 Training Programs

3.2.3.1 A+ Certification class or equivalent.

3.2.3.2 ILook Software training class or equivalent.

3.2.3.3 CyberCop Basic Data Recovery and Acquisition class or equivalent.

3.2.3.4 Additional computer forensic training (as approved by section supervisor)

3.2.3.5 General computer courses (as approved by section supervisor).

3.2.4 Demonstration

3.2.4.1 Related techniques will be observed from beginning to end and all notes will be generated by the trainee. These requirements will demonstrate that the trainee complied with all of the required procedures.

3.2.5 Laboratory Exercises

3.2.5.1 Digital Media Protection: Demonstrate the proper methods and techniques necessary to insure protection of various types of media.

3.2.5.2 Target Drive Preparation: Demonstrate the proper methods and techniques necessary to insure the target drive is properly prepared for use.

3.2.5.3 Hard Drive Imaging: Demonstrate the proper methods and techniques necessary to insure that the hard drive is imaged properly.

3.2.5.4 Removable Media Storage: Demonstrate the proper methods and techniques necessary to insure that the removable media is imaged properly.

3.3 Evaluation

3.3.1 Oral/ Written Examination

3.3.1.1 Oral review on each technique and procedure utilized in this section.

3.3.1.2 Written paper(s) on related topic to be assigned and approved by the section supervisor. This will be considered as a technical research paper.

3.3.1.3 Various techniques and terms to be defined both orally and written.

3.3.2 Laboratory Testing

- The trainee must complete at minimum of 1 year of casework under direct supervision of the Section Supervisor. This will include mock and actual cases demonstrating a variety of techniques and problem solving situations.

3.3.3 Oral Exercises

- Technical review sessions. The trainee MUST successfully complete this portion of the requirements.

3.3.4 Courtroom Exercises

- Trainee will be required to work a case that is representative of actual casework. Trainee must show the ability to defend the conclusions of the examinations and answer technical questions in a courtroom scenario. The trainee MUST successfully complete this portion of the requirements.

3.4 Examination Questions

3.4.1 Explain the process of digital media write protection and its purpose.

3.4.2 Explain a hash value and its purpose.

3.4.3 Explain target drive preparation and its purpose.

3.4.4 Explain the process of imaging digital media and its purpose.

3.4.5 Explain the process of imaging removable digital media.

3.4.6 Explain the following terms and techniques:

- Hard Drive
- Compression
- Encoding
- Hash Value
- Kilobyte, Megabyte, Gigabyte
- Wiping Process
- Motherboard
- Imaging
- File Extensions
- Proprietary File Formats
- Other terms and techniques may be added as necessary.

3.4.7 Define digital media protection.

3.4.8 Define target drive preparation.

3.4.9 Define hard drive imaging.

3.4.10 Explain the following:

- Bit Stream Copy
- MD-5 Hash
- Corrupt File
- File Extensions
- Compression
- Boot Disk
- Flash Card
- Thumb Drive
- SIM Card

3.4.11 Explain the most common limitations of processing digital media.

- Compression
- Time constraints
- File Volume

- System Files
- Proprietary Files

3.4.12 Explain the processes of wiping, imaging, hashing, examination, and reporting in a detailed manner.

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4 AUDIO MODULE**4.1 Objectives**

- 4.1.1 Understand and explain the nature of sound and how it is captured in a recording.
- 4.1.2 Understand and explain the various instruments used in analyzing sound.
- 4.1.3 Understand and explain the two categories of noise and how they relate to sound analysis.
- 4.1.4 Understand and explain the three types of distortion encountered in audio signals
- 4.1.5 Understand and explain the operation of voice recorders
- 4.1.6 Understand and explain the most common limitations of analog playback (distortion, speed errors, wow/flutter, noise floor, bandwidth, cross talk etc).
- 4.1.7 Understand and explain the most common limitations of digital recordings
- 4.1.8 Gain the capability to recognize the various tape formats and know their associated speeds.
- 4.1.9 Understand and explain the advantage of digital tape recorders over analog.
- 4.1.10 Understand and explain the various signal processing filters and how they are used in forensic audio analysis.
- 4.1.11 Gain and demonstrate the capability to use audio clarification hardware and software.
- 4.1.12 Gain the capability to do routine maintenance of audio clarification systems.

4.2 Methods of Instruction

- 4.2.1 Lectures
 - 4.2.1.1 PCAP clarification system and it's uses/operations
 - 4.2.1.2 Cardinal clarification and it's uses/operations
 - 4.2.1.3 Pro Tools and it's operation
 - 4.2.1.4 Tape formats Noise
 - 4.2.1.5 Digital vs. Analog recordings
- 4.2.2 Literature Review
 - Equipment and software Users Manuals
 - Department of Forensic Science, Digital Evidence Procedure Manual – audio sections
 - Other publications as they become available
- 4.2.3 Training Programs
 - 4.2.3.1 Signalscape video and audio – Proficient operation of software as it pertains to forensic audio analysis.

4.2.3.2 Avid video and audio – Proficient operation of software as it pertains to forensic audio analysis

4.2.3.3 Basic two day course offered by the Signalscape vendor

4.2.3.4 Basic three day course offered by AVID/Ocean Systems vendor

4.2.3.5 PCAP- Proficient operation of the hardware and software

4.2.3.6 Basic audio course offered by Digital Audio Corporation vendor

4.2.3.7 Cardinal- Proficient operation of the hardware and software

4.2.3.8 Advanced audio course offered by Digital Audio Corporation vendor (preferred)

4.2.3.9 Pro Tools- Proficient operation of software.

4.2.3.10 M-box- Proficient operation of hardware.

4.2.4 Demonstration

4.2.4.1 Basic clarification techniques will be observed from beginning to end of mock cases as well as actual cases under the direct supervision of the Section Supervisor. These techniques will be observed for understanding and the ability to put the acquired knowledge into practical use. This will include proper case documentation and case notes.

4.2.5 Laboratory Exercises

4.2.5.1 Recording Equipment

4.2.5.2 Microphone vs. pickup for telephone recordings

4.2.5.3 Cell phone vs. landline phone clarification

4.2.5.4 PCAP training recordings

4.2.5.5 Casework will be completed by the trainee under the direct supervision of the Section Supervisor- content and techniques used will be dependent on the cases submitted.

4.3 Evaluation

4.3.1 Oral/ Written Examination

4.3.1.1 Oral review on each technique and procedure utilized in this section.

4.3.1.2 Written paper(s) on related topic to be assigned and approved by the section supervisor. This will be considered a technical research paper.

4.3.1.3 Various techniques and terms to be defined both orally and written.

4.3.2 Laboratory Testing

- Trainee must complete as least 1 year of casework under the direct supervision of the Section Supervisor. This will include mock and actual cases.

4.3.3 Oral Exercises

- Technical review sessions. The trainee **MUST** successfully complete this portion of the requirements.

4.3.4 Courtroom Exercises

- Trainee will be required to work a case that is representative of actual casework. Trainee must be capable defending conclusions and answering questions in an actual courtroom scenario. The trainee **MUST** successfully complete this portion of the requirements.

4.4 Examination Questions

4.4.1 Explain how audio recording are produced.

4.4.2 What are the two categories of noise and what are the properties of each? Give an example of each.

4.4.3 Name three types of distortion encountered in audio signals.

4.4.4. Match the correct tape speed with the correct format

Standard Cassette	1 7/8 ips
Micro Cassette	15/16 ips

4.4.5 Explain the advantage of digital tape recordings over analog recordings.

4.4.6 Define the following terms:

- Dynamic Range
- Octave
- Impedance
- Noise
- Crosstalk
- Azimuth
- Signal-to-noise Ratio
- Attenuation
- Additive Noise
- Convolutional Noise
- Transfer Function
- Tonal Noise
- Frequency
- Decibel
- Analog
- Digital
- Wow and Flutter
- Ferric Oxide
- Analog to Digital Conversion
- White Noise
- Broadband Noise
- AC Hum
- Other terms may be added as necessary

4.4.7 Explain extraction of audio from video recordings

4.4.8 Explain the difference between balanced and unbalanced inputs.

- 4.4.9 Explain multi-directional, parabolic, and shotgun microphones.
- 4.4.10 What is the speed of sound in air at 21 degrees C/
- 4.4.11 What is the range of frequencies are typically analyzed in forensic audio processing? Why?
- 4.4.12 What is the dynamic range of analog tape?
- 4.4.13 Briefly explain each of the following filters/audio level controls:

- High pass
- Low pass
- Band pass
- Band stop Notch
- Slot
- Graphic Equalizer
- Parametric Equalizer
- Limiter
- Automatic gain Control
- Compressor/Expander
- Comb
- Spectral Inverse
- One Channel Adaptive

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5 RECONSTRUCTION MODULE**5.1 Objectives**

- 5.1.1 Understand and explain the components of video cassettes and the various types of video players /recorders.
- 5.1.2 Understand and explain the components of an audio cassette and the various types of players/recorders.
- 5.1.3 Understand and explain how audio and video signals are recorded onto magnetic media and digital media.
- 5.1.4 Gain the capability to splice both audio and video media.

5.2 Methods of Instruction

- 5.2.1 Lectures
 - 5.2.1.1 How video recordings are produced.
 - 5.2.1.2 How audio recordings are produced.
 - 5.2.1.3 Video formats
 - 5.2.1.4 Audio formats
 - 5.2.1.5 How VCR's function
 - 5.2.1.6 How audio recorders function
 - 5.2.1.7 How digital video recorders function
 - 5.2.1.8 How digital audio recorders function
 - 5.2.1.9 Evidence handling and note taking.

5.2.2 Literature Review

Inglis, Andrew F and Luther, Arch C. Video Engineering. 3rd edition. McGraw-Hill: New York, 1999.

Davies, Adrian and Fennessy, Phil. Digital Imaging. 4th edition. Focal Press: Oxford, 2001

Blitzer, Herbert L and Jacobia, Jack. Forensic Digital Imaging and Photography. Academy Press: San Diego, 2002.

Equipment and Software User's manuals

Reconstruction, audio and video sections of the Departments of Forensic Science – Imaging/Audio Procedure Manual.

Digital Audio Processing Training Manual 2nd. Edition, Digital Audio Corporation, 2001.

Pohlmann, Ken C. Principles of Digital Audio, 4th. Edition, McGraw-Hill, 2000.

Additional publications as they become available

5.2.3 Demonstration

- Basic reconstruction techniques will be observed and evaluated from beginning to end and notes will be taken by the trainee. This notes and techniques will be reviewed by the section supervisor.

5.2.4 Laboratory Exercises

5.2.4.1 Audio media reconstruction to include standard and micro cassette

5.2.4.2 Video media reconstruction to include VHS and HI 8.

5.2.4.3 Casework will be completed by trainee under direct supervision of the Section Supervisor. The content and techniques used will be dependent on the type of cases submitted.

5.3 Evaluation

5.3.1 Oral/ Written Examination

5.3.1.1 Oral review on each technique and procedure utilized in this section.

5.3.1.2 Technical paper on how video recordings are produced (concurrent assignment with video module).

5.3.1.3 Various techniques and terms to be defined both orally and written

5.3.2 Laboratory Testing

- The trainee must complete at minimum of 9 months of casework under direct supervision of the Section Supervisor. This will include mock and actual cases.

5.3.3 Oral Exercises

- Technical review sessions

5.3.4 Courtroom Exercises

- Trainee must show the ability to defend the conclusions of the examinations and answer technical questions in a courtroom scenario. The trainee **MUST** successfully complete this portion of the requirements.

5.4 Examination Questions

5.4.1 What are the dimensions of the typical VHS media?

5.4.2 What are the dimensions of the typical audio media?

5.4.3 Explain the inter workings of the video cassette and their functions.

5.4.4 Explain the inter workings of the audio cassette and their functions.

5.4.5 Define helical scan.

5.4.6 Demonstrate and explain the tracks which are recorded onto video media.

5.4.7 What is the speed of the video head when engaged?

- 5.4.8 In SP mode, how fast is the video media moving past the head? In LP mode? In EP mode?
- 5.4.9 Explain the mechanics of the VCR and the video cassette as they relate to one another.
- 5.4.10 How much media is present in a typical 90minute cassette?
- 5.4.11 Demonstrate and explain the tracks which are recorded onto an audio media.
- 5.4.12 Explain why there are different audio cassettes available.
- 5.4.13 What is bias?
- 5.4.14 Define voltage.
- 5.4.15 Define wattage.

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6 REVERSE PROJECTION/PHOTOGRAMMETRY MODULE

6.1 Objectives

- 6.1.1 Understand and explain the theory of Reverse Projection and Photogrammetry.
- 6.1.2 Understand and explain the proper procedures for documentation in preparation for reverse Projection/Photogrammetry analysis.
- 6.1.3 Understand and explain the importance of determining the original camera position.
- 6.1.4 Understand and explain the object of interest, its orientation within the scene and its relation to fixed objects.
- 6.1.5 Understand and explain measuring devices and their orientation and estimated location within the scene.
- 6.1.6 Understand and explain the significance of measurements within the scene.
- 6.1.7 Explain the importance of the side by side comparison of questioned to known images.
- 6.1.8 Explain and demonstrate the calculation of the data.

6.2 Methods of Instruction

- 6.2.1 Lectures
 - 6.2.1.1 The importance of reverse projection and its significance.
 - 6.2.1.2 Discuss the proper procedures for documentation of the process.
 - 6.2.1.3 The importance of the original camera position.
 - 6.2.1.4 The significance of the location of the area of interest and its orientation within the scene.
 - 6.2.1.5 Explain and demonstrate a variety of measuring devices and their orientation within the scene.
- 6.2.2 Literature Review
 - Vordor Bruegge, Richard W. Determining a Bank Robber's Height from video using Reverse Projection Photogrammetry, "MAAFA Newsletter, Vol. 23 (2), 5-6 1995.
 - Whinnall, Jack, Millen-Playter, Kimberly, and Moffitt, Frances H. The Reverse Projection Techniques in Forensic Photogrammetry. "Functional Photography, January/February 1998, 32-38.
 - Cadigan, James, and Stokes, William. "Determining a Firearm's Length from Photograph using reverse Projection Photogrammetry", AFTE Journal, Vol 25. (4). 1993, 6pp.
 - Ingles, Andrew F., Luther, Arch C. Video Engineering, 2nd edition, McGraw-Hill 1996
 - Whitaker, Jerry, Benson, Blair. Video and Television Engineering. 3rd edition, McGraw-Hill, 2000.
 - Damjanovski, Vlado. CCTV, Butterworth,-Heinemann, 2000
 - Additional publications as they become available.
- 6.2.3 Demonstration

6.2.3.1 Basic Reverse Projection Techniques will be observed and evaluated from beginning to end and notes will be taken by trainee. These notes, printouts and calculations will be reviewed by the Section Supervisor or designee.

6.2.4 Laboratory Exercises

6.2.4.1 Mock cases will be established and the trainee will complete each exercise and produce a report including case notes resulting in a conclusion.

6.3 Evaluation

6.3.1 Oral and Written Examinations

6.3.1.1 Oral review on each technique and procedure utilized in this section

6.3.1.2 Technical paper on Reverse Projection & Photogrammetry

6.3.1.3 Formal presentation on Reverse Projection and Photogrammetry

6.3.2 Laboratory Testing

6.3.2.1 The trainee must complete a minimum of six months of mock and actual case work under the direct supervision of the Section Supervisor or designee.

6.3.3 Oral Exercises

6.3.3.1 Technical Review Sessions

6.3.4 Court Room Exercises

6.3.4.1 The trainee must show the ability to defend their conclusions of the analysis and clearly respond to technical questions in a courtroom scenario. The trainee MUST successfully complete this portion of the requirements.

6.4 Examination Questions

6.4.1 Explain the concept of Reverse Projection & Photogrammetry.

6.4.2 Explain the importance of optimization of the video signal.

6.4.3 Explain the importance of utilizing the proper playback device.

6.4.4 Explain the importance of determining if the individual is standing upright.

6.4.5 Explain the importance of determining if a sufficient set of fixed objects are present within the scene.

6.4.6 Explain the importance of determining a sufficient number of reference points.

6.4.7 Explain the importance of locating and placing the height chart should be located.

6.4.8 Explain the importance of positive control.

6.4.9 Explain the purpose of side by side comparison.

6.4.10 What is camera-scene geometry?

7 AUTHENTICATION OF MEDIA MODULE**7.1 Objectives**

- 7.1.1 Understand and explain the purpose and value of Authentication.
- 7.1.2 Understand and explain the limitations of Authentication.
- 7.1.3 Understand and explain the proper procedures to be applied to an Authentication analysis.
- 7.1.4 Demonstrate the ability to communicate and defend the results of an analysis involving Authentication.

7.2 Methods of Instruction

7.2.1 Lectures

- 7.2.1.1 Theory and purpose of Authentication
- 7.2.1.2 Limitations of Authentication
- 7.2.1.3 Discontinuities in electric signals
- 7.2.1.4 Physical Characteristics
- 7.2.1.5 Quality and its effects
- 7.2.1.6 Content and its effects
- 7.2.1.7 Color quality, text quality, signal noise and distortion
- 7.2.1.8 Head switching
- 7.2.1.9 Signal errors
- 7.2.1.10 Video signal and color information
- 7.2.1.11 Video signals and embedded electronic information.
- 7.2.1.12 Physical inspection of media
- 7.2.1.13 Proper documentation of case notes

7.2.2 Literature Review

Equipment and Software Manuals

Digital Audio Processing Training Manual 2nd Edition, Digital Audio Corporation

Inglis, Andrew F and Luther, Arch C Video Engineering. 3rd edition. McGraw-Hill: New Your, 1999.

Pohlmann, Ken C. Principles of Digital Audio, 4th. Edition, McGraw-Hill, 2000.

Dino, Brugioni, A., Photo Fakery. Brassey's 1999

Whitaker, Jerry C. Signal Measurement, Analysis and Tester's, CRC Press 1999

Additional publications as they become available.

7.2.3 Demonstration

7.2.3.1 Authentication techniques for both audio and video will be observed and evaluated from beginning to end and notes will be taken by the trainee. These notes, printouts and conclusions will be reviewed by the Section Supervisor or designee.

7.2.4 Laboratory Exercises

7.2.4.1 Mock cases will be established and the trainee will complete each exercise and produce a report including case notes rendering a conclusion.

7.3 Evaluation

7.3.1 Oral and Written Examinations

7.3.1.1 Oral review on each technique and procedure utilized in this section

7.3.1.2 Technical paper on audio and video authentication

7.3.1.3 Formal presentation on audio and video authentication.

7.3.2 Laboratory Testing

7.3.2.1 The trainee must complete a minimum of six months of mock and actual case work under the direct supervision of the Section Supervisor or designee.

7.3.3 Oral Exercises

7.3.3.1 Technical review sessions

7.3.4 Courtroom Exercises

7.3.4.1 The trainee must show the ability to defend their conclusions of the analysis and clearly respond to technical questions in a courtroom scenario. The trainee **MUST** successfully complete this portion of the requirements.

7.4 Examination Questions

7.4.1 What is the purpose of a preliminary overview of the area of interest?

7.4.2 What information will be included in the case notes?

7.4.3 Explain the importance of recovering embedded electronic information.

7.4.4 What information might be included in the embedded electronic data?

7.4.5 Why should a physical inspection be conducted?

7.4.6 What is magnetic tape development?

7.4.7 If the original recording device is submitted, what would be the purpose of analyzing this device?

7.4.8 Is the chronology important in a recording? If so why?

7.4.9 Is it necessary to conduct a comparison between multiple submitted items? Why?

8 COMPARATIVE ANALYSIS MODULE

8.1 Objectives

- 8.1.1 Understand and explain the theory of individualization of persons or objects depicted in images through the use of class and individual identifying characteristics.
- 8.1.2 Understand and explain the various techniques incorporated in the process of comparative analysis.
- 8.1.3 Recognize and demonstrate common problems that may interfere and hinder the comparison of objects and individuals.
- 8.1.4 Understand, explain and demonstrate class and individual characteristics and their effects on associations.
- 8.1.5 Gain and understand the capability of utilize the various hardware and software programs and understand their effects on the comparison process.
- 8.1.6 Gain the capability to make comparisons between known and unknown images of people, property and clothing.

8.2 Methods of Instruction

8.2.1 Lectures

8.2.1.1 Theory and methodology of comparative analysis

8.2.1.2 Different types of formats and their effects on results.

8.2.1.3 Understanding garment manufacturing

8.2.1.4 Understanding the difference between class and unique characteristics

8.2.1.5 Individualization of images using quality and quantity of information.

8.2.1.6 Guidelines for the Best Practices in Comparative Analysis

8.2.1.7 Note taking

8.2.1.8 Comparison interpretation

8.2.1.9 Chart and court displays.

8.2.2 Literature Review

Inglis, Andrew F and Luther, Arch C. Video Engineering. 3rd edition, McGraw-Hill, New York, 1999.

Davies, Adrian and Fennessy, Phil. Digital Imaging. 4th edition, Focal Press, Oxford, 2001.

Blitzer, Herbert L and Jacobia, Jack. Forensic Digital Imaging and Photography. Academy Press, San Diego, 2002.

Equipment and Software Users Manuals.

Department of Forensic Science, Digital Evidence Procedures Manual – video sections.

Department of Forensic Science, Quality Manual.

Best Practices for the Retrieval of Analog and Digital Video Evidence.

New Publications as they become available.

8.2.3 Training Programs

8.2.3.1 Photoshop Basics - Proficient operation of the software as it pertains to video analysis; to include use of de-interlace, filter routines, levels, layering, etc.

8.2.3.2 SignalScape/StarWitness Video and Audio system - Proficient operation of software as it pertains to forensic video analysis. Two day class offered by the vendor in the operation of their software programs.

8.2.3.3 Avid Video Analysis System - Proficient operation of software as it pertains to forensic video analysis. Three day class offered by the vendor in the operation of their software programs.

8.2.3.4 Basic Forensic Video and the Law course, offered by the Forensic Enforcement/Emergency Services Video Association, (LEVA). Advanced course preferred.

8.2.3.5 Video/Image Comparison course, offered by LEVA.

8.2.4 Demonstration

8.2.4.1 Comparative Analysis casework techniques will be observed from beginning to end and notes will be taken by the trainee. These requirements will demonstrate that the trainee complied with the required procedures.

8.2.5 Laboratory Exercises

8.2.5.1 Photography - demonstrate the understanding of focal length and exposure and its effects on visual results.

8.2.5.2 Viewing various types of media to understand the causes, effects and limitations of the comparative analysis process.

8.2.5.3 Casework will be completed by the trainee under the direct supervision of the section supervisor or designee; content and technique used will be dependent on the cases submitted. These cases will consist of both mock and actual cases utilizing a variety of problem solving techniques.

8.3 Evaluation

8.3.1 Oral and written examinations

8.3.1.1 Oral review on each technique and procedure utilized in this section.

8.3.1.2 Written paper(s) on the theory of individualization or related topic to be assigned and approved by the section supervisor; this will be considered as a technical research paper.

8.3.1.3 Various techniques and terms to be defined both orally and written.

8.3.2 Laboratory Testing

8.3.2.1 Trainee must complete a minimum of 1 year of casework under the direct supervision of the Section Supervisor or designee. This will include mock and actual cases demonstrating a variety of problem solving solutions.

8.3.3 Oral Exercises

8.3.3.1 Technical review sessions. The trainee **MUST** successfully complete this portion of the requirements.

8.3.4 Courtroom Exercises

8.3.4.1 Trainee will be required to work a case that is representative of actual casework. Trainee must then show the ability to defend the conclusion of the examinations and answer technical questions in a courtroom scenario. The trainee **MUST** successfully complete this portion of the requirements.

8.4 Examination Questions

8.4.1 What is individualization?

8.4.2 Explain class and individual characteristics

8.4.3 Explain how garments are produced

8.4.4 Explain the effects of compression on images

8.4.5 Explain limitations placed on comparative analysis by media

8.4.6 Explain artifacts and their effects on comparative analysis and individualizations

8.4.7 Explain the methodology of individualization

8.4.8 Describe the history of individualization

8.4.9 Explain the following terms/techniques:

- Field
- Frame
- CCD
- Switcher
- Multiplexer
- Time-Lapse (advantages/disadvantages)
- Pixel
- Resolution
- Focal Length
- Compression
- DVR
- Multiplex Recordings (advantages/disadvantages)
- Interpolation
- Frame grabber
- NTSC
- Artifacts
- Compression
- Other terms may be added as necessary

8.4.10 Provide a definition of comparative analysis

8.4.11 Explain the difference between class and individual characteristics and their effects on your conclusion of an analysis

8.4.12 Explain the most common clarification techniques:

- Interlace/Deinterlace
- Brightness
- Contrast
- Sharpening
- Levels
- Frame averaging

8.4.13 Explain the most common limitations in comparative analysis

- Poor tape quality
- Out-of-sync switching
- Camera placement
- Focal length
- Quad recordings
- Electrical interference
- Multiplexing
- Compression
- Resolution

8.4.14 Explain NTSC

8.4.15 Explain compression

8.4.16 Explain focal length

8.4.17 What is a frame grabber?

8.4.18 Name two types of compression methods and explain the difference between the

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9 DIGITAL SIGNAL TRANSMITTING AND STORAGE DEVICES MODULE

9.1 Objectives

- 9.1.1 Understand and explain the variety of digital media and their functions.
- 9.1.2 Understand and explain the write blocker process.
- 9.1.3 Understand and explain the process of imaging digital media.
- 9.1.4 Understand and explain the function of the hash and its purpose.
- 9.1.5 Gain the capability to utilize various hardware and software programs utilized in the processing of digital media.
- 9.1.6 Gain the capability to perform wiping, imaging and hashing of digital media.

9.2 Methods of Instruction

9.2.1 Lectures

- 9.2.1.1 Proper examination techniques and use of shielding
- 9.2.1.2 Procedures to create permanent records of stored data from cellular telephone displays.
- 9.2.1.3 Hashing digital media and its function.
- 9.2.1.4 Understanding cellular telephone transmission capabilities.
- 9.2.1.5 SIM cards and Micro Drives and their functions
- 9.2.1.6 Acquisition of data
- 9.2.1.7 Recovery of data
- 9.2.1.8 Limitations of hardware and software recovery methods.
- 9.2.1.9 Scroll capture of data
- 9.2.1.10 Proper protection and packaging of cellular evidence

9.2.2 Literature Review

Kruse, Warren G. and Jay G. Heiser. Computer Forensic Response Essentials. Boston: Addison-Wesley, 2002.

Electronic Crime Scene Investigation: A Guide for First Responders. Washington, D.C.: U.S. Department of Justice, 2001.

Best Practices for Seizing Electronic Evidence A Pocket Guide for First Responders. 3rd edition Washington, D.C.: U.S. Federal Bureau of Investigation, 2006.

Digital Intelligence User's Manual.

Logicube Desktop Write Protect Hard Drive Imagers User's Manuals.

ILook User's Manual.

Owner's Manuals, User's Manuals and vender specific manuals should be referred to for equipment instructions.

Department of Forensic Science, Digital Evidence Procedures Manual – Sections 3 – 10.

Department of Forensic Science, Quality Manual.

New relevant material as it becomes available.

9.2.3 Training Programs

9.2.3.1 A+ Certification class or equivalent

9.2.3.2 FTK Software training class or equivalent

9.2.3.3 CyberCop Basic Data Recovery and Acquisition class or equivalent

9.2.3.4 Data Pilot/Secure View training

9.2.3.5 Additional Forensic Cell Phone training (as approved by section supervisor)

9.2.3.6 General computer courses (as approved by section supervisor)

9.2.4 Demonstration

9.2.4.1 Related techniques will be observed from beginning to end and all notes will be generated by the trainee. These requirements will demonstrate that the trainee complied with all of the required procedures.

9.2.5 Laboratory Exercises

9.2.5.1 Demonstrate the proper methods and techniques necessary to insure protection of cellular or transmitting types of evidence.

9.2.5.2 Demonstrate the proper methods and techniques necessary to ensure the integrity of the evidence is maintained.

9.2.5.3 Demonstrate the proper methods and techniques necessary to ensure that the necessary data is recovered from SIM cards and/or Micro drives.

9.2.5.4 Demonstrate proper preparation and software operation.

9.3 Evaluation

9.3.1 Oral and written examinations

9.3.1.1 Oral review on each technique and procedure utilized in this section.

9.3.1.2 Written paper(s) on related topic to be assigned and approved by the section supervisor; this will be considered as a technical research paper.

9.3.1.3 Various techniques and terms to be defined both orally and written.

9.3.2 Laboratory Testing

9.3.2.1 The trainee must complete at minimum of 1 year of casework under direct supervision of the section supervisor. This will include mock and actual cases demonstrating a variety of techniques and problem solving situations.

9.3.3 Oral Exercises

9.3.3.1 Technical review sessions. The trainee MUST successfully complete this portion of the requirements.

9.3.4 Courtroom Exercises

9.3.4.1 Trainee will be required to work a case that is representative of actual casework. Trainee must show the ability to defend the conclusions of the examinations and answer technical questions in a courtroom scenario. The trainee MUST successfully complete this portion of the requirements.

9.4 Examination Questions

9.4.1 Explain the process of digital media write protection and its purpose.

9.4.2 Explain a hash value and its purpose.

9.4.3 Explain the types of information that can be recovered for transmitting and storage devices.

9.4.4 Explain shielding and why it may be necessary.

9.4.5 Explain the function of SIM cards and Micro drives.

9.4.6 Explain the data contained on a SIM card.

9.4.7 Explain the data contained on a Micro drive.

9.4.8 Explain the process of scroll recovery.

9.4.9 Explain the function of scroll recovery.

9.4.10 Explain the following terms and techniques.

9.4.11 Explain how deleted data might be recovered.

9.4.12 Explain and define the following terms:

- Cellular
- Dialed call log
- Received call log
- Password protected
- Shielding
- Call history
- Date and time
- GPS
- Compression
- Encoding
- Hash Value

- Kilobyte, Megabyte, Gigabyte
- File Extensions
- Proprietary File Formats
- Other terms and techniques may be added as necessary.

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APPENDIX A -TRAINING AND ASSESSMENT/TRAINING OF EXPERIENCED PERSONNEL**1.1 OVERVIEW**

- 1.1.1 The goal of this manual is to provide uniform coordination and quality training in all aspects of the Digital and Multimedia Evidence Section. Training is multi-faceted and ever changing. The sections of this manual are outlined to allow for changes in technologies and processing techniques that are current for the training period. The sequence in which the modules are presented in the outline should not necessarily be considered as a mandatory order of instruction. Exposure to case examinations, legal aspects and testimony will be continuous throughout the training period.
- 1.1.2 The Training Program will be coordinated by the Training Coordinator (TC). The length of the training period is a highly variable matter and will be left to the determination of the Supervisor and/or TC, with approval of the Physical Evidence Program Manager. Certain individuals may require less time than others, depending on experience, education, or learning ability. However, the training period should require a minimum of 10 - 12 months for each sub discipline, which is to include successful completion of a mock trial.
- 1.1.3 Coordination of the training program will be conducted by the Section Supervisor of the training laboratory or other designated experienced Forensic Scientist as approved by the Physical Evidence Program Manager. The Training Coordinator (TC) will be responsible for the overall training, which will incorporate all of the listed topics, but may delegate certain duties and blocks of instruction to other examiners in the section. The TC is responsible for assuring that the appropriate Digital and Multimedia Training Record (DFS Documents 242-F200, 242-F201, 242-F202, 242-F203, 242-F204, 242-F205 and 242-F206) depending on the sub discipline(s) for which the trainee is being assessed is completed in a timely fashion as training progresses. The various activities for the Modules will be assessed on a Pass/Fail basis. Periodic performance evaluations, at a minimum of every 90 days, of the trainee will be prepared by the TC and be provided to the Physical Evidence Program Manager and the Laboratory Director of the laboratory in which the trainee is being trained. If the TC is a designee of the Section Supervisor, the report should also be forwarded to the trainee's supervisor and the Section Supervisor. The report should include the following: progress during the evaluation period; evaluation of the trainee's notebook; information about any graded written and oral examinations and presentations given; future objectives. The TC is required to discuss each evaluation with the trainee prior to forwarding it to the Physical Evidence Program Manager and Laboratory Director. Any relevant comments by either the trainee or coordinator are to be included with the report. Should a trainee demonstrate a deficiency which may impact successful completion of the training program, the TC will notify the trainee's Supervisor, who will notify the Section Supervisor (if different from Supervisor), the Physical Evidence Program Manager and the Laboratory Director within five working days.
- 1.1.4 The trainee is expected to keep a loose-leaf notebook of information compiled during the training program. Copies of written examinations, presentations and research papers prepared during training will be maintained in the notebook. Documentation of the completion of the suggested reading list for each module should be maintained. Written answers to any study questions provided by the TC should also be maintained in the notebook. The written answers to the study questions will be used as reference material once the trainee is qualified as an examiner. Therefore, references are to be listed for each response whenever possible. As designated by the TC, the trainee may assist with casework during the training, only under the direct supervision of a qualified examiner. The trainee will maintain a monthly log of activities and provide it to the TC at the end of each month.
- 1.1.5 The case samples for the final practical test will be fabricated and validated as per Quality Manual 19.5.3.2, at the direction of the Physical Evidence Program Manger with guidance from the DE Section Supervisor. The case samples serve as a monitor of the individual's competency in applying techniques and procedures to actual casework samples in accordance with the DE Procedures Manual and the DFS Quality Manual. Once the individual completes the practical test and obtains the expected results, a technical oral examination will be administered.

- 1.1.6 The technical oral examination will be given by the Laboratory's DE Section Supervisor and Training Coordinator in the presence of the Physical Evidence Program Manager and other Department management (as required) to ascertain the technical knowledge of the individual. This examination will be limited to three (3) hours. After the examination, supervision/management will assess the individual's performance. The performance of the individual will be determined to be either satisfactory or unsatisfactory. If the performance is deemed to be unsatisfactory, steps must be taken to effect the appropriate action. After satisfactory completion of the technical oral examination, the individual will be subjected to a final mock trial.
- 1.1.7 A videotaped final mock trial will follow the successful completion of the technical oral examination. The Physical Evidence Program Manager must agree with the selection of all participants for the trial. The atmosphere of the final mock trial will be formal, in that it will be conducted in the same format and manner as an actual courtroom situation. Answers and explanations are to be delivered to a lay jury. The final mock trial will not exceed two (2) hours. The role of the prosecutor will be assumed by the TC or a designee. There may be two defense lawyers, one of whom must be qualified in the sub discipline for which the trainee is being tested. The Quality Assurance (QA) Coordinator, if available, will serve as the judge. If the QA Coordinator is not available, the Physical Evidence Program Manager will select an appropriate individual to serve as the judge. The trial may be stopped at any time upon the request of any of the involved parties. After the trial, supervision/management will assess the individual's performance as either satisfactory or unsatisfactory. If the individual's performance is determined to be unsatisfactory, steps must be taken to effect appropriate action.
- 1.1.8 After successful completion of the technical oral examination and the final mock trial, the Physical Evidence Program Manger will document, initial and date the technical and mock trial sections on the appropriate page of the sub discipline's Digital and Multimedia Evidence Training Record (DFS Documents 242-F200, 242-F201, 242-F203, 242-F204, 242-F205, 242-F206, 242-F207) to the Physical Evidence Program Manager will forward a written recommendation through the QAC to the Department Director in accordance with Section 19.6.1 of the Quality Manual.
- 1.1.9 Upon completion of the training, the student will have attained the necessary knowledge, skills and abilities to independently perform casework. Regardless of how well a new examiner handled their assignments during the training period, there follows a period of adjustment. The employee's Supervisor and/or the TC should monitor the new examiner's casework for a period of at least six (6) months following certification by the Department.

1.2 ASSESSMENT/TRAINING OF EXPERIENCED PERSONNEL

- 1.2.1 The responsibility for assessing the degree of qualifications of newly hired personnel who have previously successfully completed a qualifying training program of instruction in Digital and Multimedia Evidence shall lie with the Section Supervisor or Designee with approval from the Physical Evidence Program Manager. The contents of sections of this manual may be skipped for a previously trained examiner who has demonstrated to the TC a comprehensive knowledge of the section's subject matter with the approval of the Physical Evidence Program Manager. In order to substitute for the entirety of the training specified in this manual, the qualifying course must have been formally structured, must have covered all appropriate facets of the sub discipline in which the trainee is being qualified, must have been administered by a reputable organization (or individual), and the duration should be about one year or longer (full-time). Methods of verifying the completion of prior training could include reviewing the individual's job application, personal interview, review of transcripts or prior training records, checking references, consulting with previous training coordinators, administering a series of practical exams, and/or written and/or oral technical exams. Newly hired personnel shall not be considered for certification by the Department Director (or appropriate designee) to begin any actual casework until each has successfully completed at least one competency test, consisting of a practical test, a technical oral examination and a final mock trial. The employee's Supervisor should monitor the new employee's casework for a period of at least six (6) months following certification by the Department.

APPENDIX B - ORIENTATION**1. OVERVIEW**

- 1.1 Before beginning the training program, an orientation of the new employee will include an introduction to the operating facilities and personnel. A work/study area will be assigned by the Section Supervisor. In addition, the following documents will be covered: Quality Manual; Departmental Administrative Policies; Regional Operating Procedures (ROP); Section Procedures Manual; Section Training Manual; DFS Safety Manual; organizational chart of the Department of Forensic Science.
- 1.2 An introduction to the technical capabilities of all regional laboratories, to include the regional boundaries and areas of overlap will be discussed.
- 1.3 The outline of the training program and the expectations of both the TC and the trainee will be discussed.
- 1.4 An explanation of the operation of local, state and federal law enforcement agencies and court systems will be provided.
- 1.5 The duties of a forensic latent print examiner will be clarified.
- 1.6 The employee will also be introduced to the Department's LIMS system.

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